

PATENT ABSTRACTS OF JAPAN

(11) Publication number : 08-336884

(43) Date of publication of application : 24.12.1996

(51) Int.Cl.

B29C 47/14
 B29C 47/06
 B29C 55/12
 B29C 69/00
 // B29K 23:00
 B29L 7:00
 B29L 9:00

2D 52

(21) Application number : 08-111615

(71) Applicant : HOECHST AG

(22) Date of filing : 02.05.1996

(72) Inventor : PEIFFER HERBERT
 SCHLOEGL GUNTER
 KOCHM KARL-HEINZ
 BUSCH DETLEF DR
 SCHMIDT ROBERT

(30) Priority

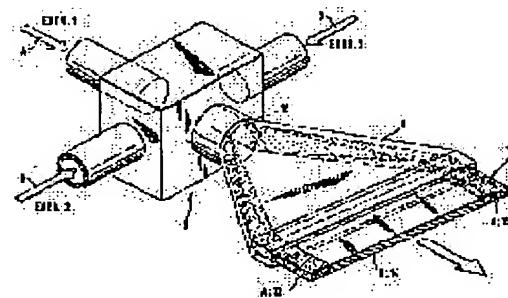
Priority number : 95 19515599 Priority date : 02.05.1995 Priority country : DE

(54) PRODUCTION OF POLYPROPYLENE FILM

(57) Abstract:

PROBLEM TO BE SOLVED: To produce a film containing polypropylene of high quality by together extruding a plurality of kinds of melts through a flat sheet die at the same time and forming the edge portions of a film from a propylene polymer or a propylene polymer mixture during a production process.

SOLUTION: The compression, heating and melting of polymers and the supply of melt streams A, B are performed simultaneously by using a coextrusion adapter 6. However, the melt streams A, B are arranged in parallel 16. The juxtaposed melts are shaped into a film in a flat sheet die 8 and the edge parts of the film are formed from a polymer A (from the melt stream from an extruder 2). The actual film 14 includes a polymer B (from the melt stream of an extruder 1). These edge parts 12 are cut off after the longitudinal and transverse stretching of the film.



LEGAL STATUS

[Date of request for examination] 25.04.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than

the examiner's decision of rejection or
application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision
of rejection]
[Date of requesting appeal against examiner's
decision of rejection]
[Date of extinction of right]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] Heat the propylene polymer B within an extruder and it extrudes through the melt of the propylene polymer B to a flat sheet die. The melt which comes out of a flat sheet die is rolled round on one or more rolls. Make it solidify, obtain a pre film and make this pre film extend in a lengthwise direction and the crossing direction. It is the manufacture approach of the biaxial orientation polypropylene film containing at least one layer, (1) propylene polymer or the propylene polymer mixture A is heated in the 2nd extruder, and it fuses.;

(2) How to include cutting the edge part of the film which supplies the melt of a propylene polymer or the propylene polymer mixture A to the both sides of the propylene polymer melt B, and contains; and (3) propylene polymer, or the propylene polymer mixture A after the lengthwise direction drawing of a film, and the crossing direction drawing so that two kinds of melts may be simultaneously extruded together through a flat sheet die and a propylene polymer or the propylene polymer mixture A may form the edge part of a film into a manufacture process.

[Claim 2] The approach according to claim 1 the propylene polymer B and a propylene polymer differ from the propylene polymer mixture A about those residual ash contents.

[Claim 3] A propylene polymer or the residual ash content of the propylene polymer mixture A is the approach of the ash content of the propylene polymer B according to claim 1 or 2 of being at least 3 times preferably, twice [at least].

[Claim 4] It is the approach according to claim 1 to 3 B has a <=50ppm residual ash content preferably,<=70 ppm of propylene polymers.

[Claim 5] It is the approach according to claim 1 to 4 B has a <=20ppm residual ash content preferably,<=50 ppm of propylene polymers.

[Claim 6] The approach according to claim 1 to 5 the propylene polymer B has 90 – 100% of the weight of a propylene unit, and has the melting point of 130 degrees C or more, and a melt flow index for 0.5–10g / 10 minutes.

[Claim 7] The approach according to claim 1 to 6 the propylene polymer B has the average molecular weight Mw of 150,000–400,000 within the limits, and Mw/Mn of 2–15 within the limits.

[Claim 8] The approach according to claim 1 to 7 of adding a stabilizer, a neutralizer, or a stabilizer and a neutralizer to the propylene polymer B.

[Claim 9] The approach according to claim 1 to 8 the propylene polymer B contains neither an antistatic agent nor lubricant.

[Claim 10] The approach according to claim 1 to 9 a propylene polymer or the residual ash content of the propylene polymer mixture A is 50–800 ppm, and a chlorine content is 20–100 ppm.

[Claim 11] The approach according to claim 1 to 10 a propylene polymer or the propylene polymer mixture A has 90 – 100% of the weight of a propylene unit, and has the melting point of 130 degrees C or more, and a melt flow index for 0.3–15g / 10 minutes.

[Claim 12] The approach according to claim 1 to 11 a propylene polymer or the propylene polymer mixture A has the average molecular weight Mw of 150,000–400,000 within the limits, and Mw/Mn of 2–15 within the limits.

[Claim 13] The approach according to claim 1 to 12 a propylene polymer or the propylene

polymer mixture A decomposes with a peroxide, and decomposition multipliers (degradation factor) are 3-15.

[Claim 14] The approach according to claim 1 to 13 of adding a neutralizer, a stabilizer, or a neutralizer and a stabilizer into a propylene polymer or the propylene polymer mixture A.

[Claim 15] It is the approach according to claim 1 to 14 15 degrees C or less of 10 degrees C or less of melting points with the propylene polymers B and A differ preferably from mutual.

[Claim 16] The approach according to claim 1 to 15 the melt flow index of a propylene polymer or the propylene polymer mixture A is 3 or less times of the melt flow index of the propylene polymer B.

[Claim 17] The approach according to claim 1 to 16 a polypropylene film has the further layer.

[Claim 18] It is the approach according to claim 1 to 17 of being 100-200mm preferably 300mm, while the edge part cut in a process (3) manufactures.

[Claim 19] The approach according to claim 1 to 18 in which an edge does not carry out orientation in essence in the crossing direction.

[Claim 20] An edge is 20-100-micrometer thickness and the approach according to claim 1 to 19 of being 20-50-micrometer thickness preferably.

[Claim 21] It is the approach according to claim 1 to 20 the edge cut contains 50 - 100% of the weight of a propylene polymer, or the propylene polymer mixture A preferably at least 30% of the weight.

[Claim 22] The approach according to claim 1 to 21 of supplying by the simultaneous extruding die turning around 90 degrees of polymer melts.

[Claim 23] The method according to claim 1 to 22 of supplying an eyelet die through the polymer melt B, and pouring in polymer melt or the propylene polymer mixture A from a longitudinal direction.

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the manufacture approach of the biaxial orientation polypropylene film containing at least one layer, and the usage of a film.

[0002]

[Description of the Prior Art] A biaxial orientation polypropylene film (boPP film) is used for a package application with various many for those good performance characteristics. These good performance characteristics have a high mechanical strength, good dimensional stability, and high gloss, for example. A boPP film is used for industrial use in most amount other than the activity as a package film. An activity can be mentioned as an electric insulation film in metalization, transfer metalization, a lamination, and capacitor manufacture.

[0003] The manufacture approach that biaxial orientation polypropylene films are various is common knowledge in the advanced technology. In the so-called tenter process, a boPP film is extruded and is manufactured by molding in a flat sheet die, and the drawing in a lengthwise direction and the crossing direction.

[0004] Especially by this approach, in an extruder, compress, heat and fuse a propylene polymer, next extrude the melt corresponding to each layer of a film from a flat sheet die, and one or more rolls are made to roll round and solidify the film obtained by doing in this way, orientation of the film is carried out and then it carries out a heat setting. The cut roll for customers (customer-ready cut roll) is made to the equipment roll obtained by doing in this way by the last.

[0005] In this manufacture of a biaxial oriented film, the process itself produces a lot of film trimming trash as the so-called cut-off edge, for example. A cut-off edge is a film edge which is not extended although grasped with the clip of a longitudinal direction tenter. Behind orientation, since a non-extending edge is more nearly substantially [than a film] thick, it must cut off. Depending on a film and equipment width of face, the ingredient loss with a cut-off edge may become by 25 % of the weight. Since it is economical, it is required to process a cut-off edge into a re-granulation ingredient, and to add to an original raw material again during finishing, with other film trimming trash produced during start up and a halt of equipment, when tearing.

[0006] Such reuse of the film trimming trash of a raw material original for some especially applications that have high quality requirements is impossible. This corresponds to manufacture of the electric insulation film used for example, for capacitor manufacture. For these applications, a characteristic film property like a low dielectric loss factor, high specific insulation resistance, high DC and AC dielectric reinforcement, and few [do / it] defects is needed, for example. especially these properties have the low content of an ash and chlorine — it is specially obtained by the activity of the polypropylene of a high grade. Furthermore, a polymer must not have an ion component. These high quality requirements are not fulfilled any longer depending on adding film trimming trash to a high grade raw material. This means that film trimming trash is trash usable only for a low quality application [as / in manufacture or injection molding of a package film] actually in manufacture of an electric film. Therefore, especially the economic loss by the film trimming trash in manufacture of an electric film is remarkable.

[0007]

[Problem(s) to be Solved by the Invention] So, the technical problem of this invention is offering the manufacture approach of the film containing high quality (namely, high grade) polypropylene of avoiding the above-mentioned fault. Especially this approach should reduce the economic loss by the film trimming trash which cannot carry out a reuse.

[0008]

[Means for Solving the Problem] This object heats the propylene polymer B within an extruder, and extrudes it through the melt of the propylene polymer B to a flat sheet die. The melt which comes out of a flat sheet die is rolled round on one or more rolls. It is the approach of the general class stated to the beginning of making it solidifying, obtaining a pre film and making this pre film extending in a lengthwise direction and the crossing direction, (1) propylene polymer or the propylene polymer mixture A is heated in the 2nd extruder, and it fuses.;

(2) So that two kinds of melts may be simultaneously extruded together through a flat sheet die and a propylene polymer or the propylene polymer mixture A may form the edge part of a film into a manufacture process The edge part of the film which supplies the melt of a propylene polymer or the propylene polymer mixture A to the both sides of the propylene polymer melt B, and contains; and (3) propylene polymer, or the propylene polymer mixture A It is attained by the approach including cutting off after the lengthwise direction drawing of a film, and the crossing direction drawing.

[0009] According to this invention, a propylene polymer or response mixture is the reason differ about the content of those residual ashes and chlorine, and this names these polymers Polymers B and A. Generally compared with the residual ash content of the propylene polymer B, it is at least 5 times the residual ash content and chlorine content of the propylene polymer A of this at least 3 times especially preferably twice [at least]. As for this, the propylene polymer B means that it is a more expensive polymer with high quality than the propylene polymer A therefore.

[0010] The propylene polymer B is a high grade polymer. the object of this invention sake — this — the residual ash content of the propylene polymer B — 70 ppm or less — desirable — <= — it is especially <=40ppm and a chlorine content means that it is [50 ppm / 50 ppm or less] <=20ppm preferably.

[0011] Generally the propylene polymer B has 98 – 100% of the weight of a propylene unit 95 to 100% of the weight especially preferably 90 to 100% of the weight on the basis of polymer weight. general — the propylene polymer B — 130 degrees C or more — desirable — the melting point of 140–170 degrees C, and the pressure of 230 degrees C and 21.6 Ns — setting — measuring (DIN 53 735) — 0.5–10g/— it has a melt flow index for 0.8–5g / 10 minutes preferably for 10 minutes.

[0012] especially the suitable propylene polymer B — 150,000–400,000 — it has the average molecular weight Mw of 180,000–350,000 within the limits preferably. within the limits with large molecular weight distribution — it can change — Mw/Mn — general — 2–15 — desirable — 2–6 — it is especially 3–6.

[0013] the inside of the above-mentioned propylene polymer B — 1 – 15 % of the weight — desirable — 1 – 10% of the weight of n-heptane solubility fraction — having — >= — especially the isotactic propylene homopolymer that has the chain AISO taxi index (chain isotaxy index) of >=90% n-heptane insolubility fraction preferably is desirable 85%. Furthermore, the copolymer of the propylene and C4–C6 olefin which have the ethylene / propylene copolymer which has 10 or less % of the weight of an ethylene content, and 10 or less % of the weight of an olefin content, and the propylene / ethylene / butylene terpolymer which has 10 or less % of the weight of an ethylene content and 15 or less % of the weight of a butylene content are suitable. Indicated weight % is based on each propylene polymer B.

[0014] In order to improve the property of the polypropylene film by this invention of a certain kind, in being required, it adds a nucleating agent to the propylene polymer B with a stabilizer and/or a neutralizer. It is because these additives that should add neither an antistatic agent nor lubricant to the propylene polymer B do the disadvantageous effect for the electrical property of a film in the desirable embodiment about the electrical property of a request of a film. All the amounts indicated below by weight % are based on the layer which added the additive,

respectively.

[0015] The stabilizer to be used is good with the usual compound for stabilization for ethylene, a propylene, and other alpha olefin polymers. These additions are 0.05 – 2 % of the weight. The stearate of a phenol stabilizer, and alkali metal/alkaline earth metal and/or especially the carbonate of alkali metal/alkaline earth metal are suitable. It is desirable to use especially the phenol stabilizer which has the molecular weight which exceeds a mol in 500g /in 0.15 – 0.3% of the weight of an amount 0.1 to 0.6% of the weight. Pen TAERI trityl tetrakis-3-(3, 5-Gee tert-butyl-4-hydroxyphenyl) propionate, and 1, 3, 5-trimethyl –Especially 2, 4, and 6-tris (3, 5-Gee tert-butyl-4-hydroxyphenyl) benzene is advantageous.

[0016] As for a neutralizer, it is desirable that it is the SETEARIN acid calcium and/or the calcium carbonate which have the average grain size of 0.7 micrometers or less, the absolute roughness of less than 10 micrometers, and the specific surface area of at least 40m²/g. Generally, a neutralizer is added in 0.02 – 0.5% of the weight of an amount.

[0017] A nucleating agent is an organic substance and is the chemical modification derivative or bis(4-tert-butylphenyl) sodium phosphate of a JIBEN zylidene sorbitol or a JIBEN zylidene sorbitol preferably. other usable nucleating agents — for example, the metal salt of a benzoic acid — they are sodium benzoate, and Quinacridone and the Quinacridone derivative preferably. For example, talc, a silica, or an inorganic nucleating agent like a bentonite is also suitable. In this case, especially very detailed distribution of a nucleating agent is important, namely, 1 micrometer or less of average grain size is 0.7 micrometers or less preferably.

[0018] According to this invention, the propylene polymer A differs from the propylene polymer B about the residual ash content. As explained above, this is not a high grade polymer. Generally 50–800 ppm of 100–600 ppm of residual ash contents of the propylene polymer A are 200–500 ppm especially preferably. 20–100 ppm of chlorine contents are 30–70 ppm preferably.

[0019] Generally the propylene polymer A has 98 – 100% of the weight of a propylene unit 95 to 100% of the weight especially preferably 90 to 100% of the weight on the basis of polymer weight. Generally, the propylene polymer A is preferably measured in the melting point of 140–170 degrees C, and the pressure of 230 degrees C and 21.6 Ns (DIN 53 735), and has 130 degrees C or more of melt flow indices for 0.3–15g / 10 minutes.

[0020] especially the suitable propylene polymer A — 150,000–400,000 — it has the average molecular weight Mw of 180,000–350,000 within the limits preferably. within the limits with large molecular weight distribution — it can change — Mw/Mn — general — 2–15 — desirable — 2–6 — it is especially 3–5.

[0021] Desirable narrow molecular weight distribution can be acquired by peroxide decomposition of for example, the propylene polymer A. The scale of whenever [decomposition] is the so-called decomposition multiplier (degradation factor) A, this is based on a start polymer, and it is DIN53 of polypropylene. Relative change of the melt flow index by 735 is expressed.

[0022] the decomposition multiplier of the melt-flow-index propylene polymer A of the propylene polymer in which the propylene polymer before adding A=MFI2/MFI1MFI1= organic peroxide carried out melt-flow-index MFI2= peroxide decomposition — 3–15 — it is 6–10 preferably. Peroxide decomposition is advantageously carried out by addition of organic peroxide. Especially desirable organic peroxide has the alkyl radical understood to mean the usual saturation straight chain or branched chain low-grade alkyl radical to dialkyl peroxide and a carbon number 6, 2, the 5-dimethyl-2, 5-JI (tert-butylperoxy) hexane, and especially desirable G tert-butyl peroxide.

[0023] the inside of the above-mentioned propylene polymer A — 1 – 15 % of the weight — desirable — 1 – 10% of the weight of n-heptane solubility fraction — having — >= — especially the isotactic propylene homopolymer that has the chain AISO taxi index of >=90% n-heptane insolubility fraction preferably is desirable 85%. Furthermore, the copolymer of the propylene and C4–C8 olefin which have the ethylene / propylene copolymer which has 10 or less % of the weight of an ethylene content, and 10 or less % of the weight of an olefin content, and the propylene / ethylene / butylene terpolymer which has 10 or less % of the weight of an ethylene content and 15 or less % of the weight of a butylene content are suitable. Indicated weight % is based on each propylene polymer.

[0024] The mixture of the above-mentioned propylene homopolymer, a propylene copolymer, a

propylene copolymer and/or a propylene terpolymer, and other polyolefines is also suitable. Especially mixture contains at least 75% of the weight of the above-mentioned propylene polymer A at least 50 weight. Other suitable polyolefines in propylene polymer mixture are polyethylene, and the amount of such polyolefines is 10 – 40% of the weight of within the limits preferably five to 60% of the weight on the basis of the propylene polymer mixture A.

[0025] When required, the additive of an effective dose can be added to the propylene polymer A or the propylene polymer mixture A at each ****, and desirable additives are a neutralizer and/or a stabilizer. When required, an antistatic agent and/or lubricant can also exist. However, it is because there is a possibility with desirable not adding the additive (migration) which may shift that such an additive may soil the frame and other parts of a production plant by devolatilizing. These impurities may exfoliate from a frame and may fall in a film.

[0026] The class and amount of a neutralizer and a stabilizer were mentioned above about the propylene polymer B. These data are applicable like the propylene polymer A.

[0027] It should be the magnitude with almost same advantageous [that became clear, namely, 15 degrees C or less of 10 degrees C or less of these melting points differ preferably] combining especially the edge part (namely, cut-off part) containing the propylene polymer A with the actual film containing the propylene polymer B firmly, if the melting point of both polymers is the almost same magnitude. Furthermore, generally the melt flow index (MFI) of both raw materials should be mutually in agreement so that a cut-off edge and a actual film may join mutually together firmly especially. As for MFI of the propylene polymer A, it is desirable that they are 3 or less times of MFI of the propylene polymer B. When required, or MFI of both polymers can be the same magnitude, its MFI of the propylene polymer A can also be more slightly [than MFI of the propylene polymer B] low.

[0028] In fixed die setting out, it became clear that the thickness of a film edge could be controlled by MFI of Polymer A, and could be changed or adjusted, without changing the thickness of the film itself. As MFI of Polymer A is large compared with MFI of Polymer B, an edge part becomes thick and this reverse is also more possible for it. Thus, it is possible to optimize cut-off edge thickness regardless of the film manufactured. Especially this is advantageous in manufacture of an ultra-thin film. In this case, by the customary approach, in order to guarantee that a cut-off edge is sufficient thickness, a die must be opened comparatively very widely in an edge part. The danger that a die lip will bend irreversibly arises by this. Such extreme die setting out is [in / with the approach by this invention / manufacture of an ultra-thin film] already unnecessary.

[0029] A monolayer or a multilayer film can be manufactured by the approach of this invention. When a multilayer polypropylene film is required, generally such a layer contains the olefin polymer of 90 – 99.5% of the weight of the carbon numbers 2–10 in both sides preferably 75 to 100% of the weight on the basis of the weight of an outside layer at each **** including at least one outside layer.

[0030] The example of such an olefin polymer – propylene homopolymer Or – ethylene / propylene copolymer Or – ethylene / 1-butylene copolymer Or – propylene / 1-butylene copolymer Or – ethylene / propylene / 1-butylene terpolymer Or when [of the two or more sorts and terpolymer of the mixture of the two or more sorts and terpolymer of the – above-mentioned homopolymer and a copolymer or the – above-mentioned homopolymer, and a copolymer] required, it is the blend which mixed one or more sorts of the above-mentioned homopolymer, a copolymer, and a terpolymer.;

It is based on the AUW of a copolymer at propylene homopolymer or – each ****, – 1 – 10 % of the weight, The random ethylene / propylene copolymer which has 2.5 – 8% of the weight of an ethylene content preferably, or – the random propylene / 1-butylene copolymer which has 4 – 20% of the weight of a butylene content preferably two to 25% of the weight — It is based on the AUW of a terpolymer at – each ****. Preferably one to 10% of the weight Or 2 – 6% of the weight of an ethylene content, The ethylene / propylene / 1-butylene terpolymer which has 4 – 20% of the weight of 1-butylene content preferably two to 20% of the weight, It is based on the AUW of a polymer blend at – each ****. Or 0.1 – 7% of the weight of an ethylene content and 50 – 90% of the weight of a propylene content, Especially the blend with the ethylene / propylene / 1-

butylene terpolymer which has 10 – 40% of the weight of 1-butylene content, and a propylene / 1-butylene copolymer is desirable.

[0031] The propylene homopolymer used for an outside layer has the desirable isotactic gay propylene which has 140 degrees C or more of 6 or less % of the weight of n-heptane insolubility fractions including the propylene for the body (at least 90%) on the basis of; isotactic gay propylene which has the melting point of 150–170 degrees C preferably. a homopolymer — general — 1.0g / 10 minute –20g/— it has a melt flow index for 2.0g / 10 minutes – 15g / 10 minutes preferably for 10 minutes.

[0032] the blend with the copolymer, the terpolymer and copolymer, and terpolymer which were mentioned above and which are used for an outside layer — general — 1.5–30g/— it has a melt flow index for 3–15g / 10 minutes preferably for 10 minutes. The melting point is within the limits of 120–150 degrees C. The above-mentioned melt flow index is measured in the pressure of 230 degrees C and 21.6 Ns (DIN 53 735).

[0033] When required, peroxide decomposition (peroxidically degraded) can be similarly carried out to having mentioned above all the outside layer polymers mentioned above about the substratum. the decomposition multiplier (degradation factor) of an outside layer polymer — general — 3–15 — it is 6–10 preferably.

[0034] The multilayer embodiment of the film manufactured by the approach of this invention contains at least one substratum which contains the high grade propylene polymer B intrinsically, and the outside layer mentioned above. A substratum can also have an outside layer on both sides, and when required, it can also contain an additional interlayer. It is the layer in which a substratum occupies 70 – 95% preferably to 100% exceeding 50% of the total film thickness for the object of this invention. An outside layer is a outermost part layer of a film.

[0035] The total thickness of the film which can be manufactured by the approach of this invention can be changed within large limits, and it depends for it on the application of a schedule. The desirable embodiment of a film has especially the 2–100 micrometers of the 2–50 micrometers of the total thickness of 2–20 micrometers preferably. 0.5–15 micrometers of 1–10 micrometers of thickness of the interlayer of one or more existing arbitration are 2–8 micrometers especially preferably. the thickness of an outside layer is chosen regardless of other layers, and preferably, within the limits of 0.1–10 micrometers, about thickness and a presentation, the outside layer which is 0.3–2 micrometers especially preferably especially, and was applied to both sides 0.2–5 micrometers may be the same, or may differ. Therefore, the thickness of a substratum is obtained from a difference with the thickness of the outside layer used with the film total thickness, and an interlayer, and, so, can change like the total thickness.

[0036] By the approach by this invention, in main extruders (EXTR.1), the propylene polymer B is compressed first, is heated and is fused. In the 2nd extruder (EXTR.2), a propylene polymer or the propylene polymer mixture A is compressed, heated and fused. Two kinds of melts are extruded together and simultaneous from a flat sheet die in the melt of a propylene polymer or the propylene polymer mixture A by the both sides of propylene polymer B melt, and it supplies in the way a propylene polymer or the propylene polymer mixture A forms the edge part of a film into a manufacture process. For example, as shown in drawing 3 , the polymer melt A can be supplied to the edge of Melt B using the simultaneous extrusion adapter which rotates 90 degrees.

[0037] Drawing 2 shows the customary activity of the standard adapter for manufacture of the three layer film of simultaneous extrusion for a comparison. Polymer melt is similarly supplied from two extruders (EXTR.1 and EXTR.2).

[0038] (16) and a melt style are arranged so that one side may exist in the upper part of another side, so that it may illustrate. In a die, three-layer melt is molded and a multilayer film (ABA) is generated.

[0039] In contrast, drawing 3 and drawing 4 are the arrangement (it is related with drawing 2 and is 90 degrees) rotated 90 degrees, and show the activity of the simultaneous extrusion adapter 6 in the approach of this invention. Compression of a polymer, heating, melting, and supply of the melt styles A and B are carried out similarly. However, the melt styles A and B are arranged at

(16) and juxtaposition so that it may illustrate. With a flat sheet die (8), the melt arranged at juxtaposition is molded by the film 10, and the edge part (12) of a film consists of polymers A from the melt style of an extruder 2. A actual film (14) contains Polymer B (from the melt style of an extruder 1).

[0040] The mono-die (monodie) (the so-called eyelet die) with which Melt A is poured in from a longitudinal direction also fits the activity to the approach of this invention. The basic structure of an eyelet die is shown in drawing 5 and drawing 6. A flat sheet die (8) has the hole 20 per piece the left and on the right of main channels (18), respectively. Melt B is supplied to a part for the center section of a die from main channels (18). Melt A flows into 2 edge parts of a die through a hole 20. Thus, Melts A and B are molded by juxtaposition and become the film with which an edge part contains Polymer A.

[0041] Thus, the film by which extrusion molding was carried out is rolled round on one or more rolls for coagulation. It is especially proved to be advantageous to maintain preferably at least 70 degrees C of one or more rolling-up rolls for making an extrusion-molding film solidify in temperature of 80-120 degrees C.

[0042] Thus, the obtained pre film is extended in the crossing direction to a lengthwise direction and the direction of extrusion, and the biaxial orientation of a chain is produced. Biaxial orientation is carried out continuously, preferably, extends in a lengthwise direction (the direction of a machine) first, and then extends in the crossing direction (direction which makes a right angle to the direction of a machine). The draw ratio of a lengthwise direction is from 5.5:1 to 8.5:1 from 4:1 to 9:1 especially preferably, and the draw ratio of the crossing direction is from 6:1 to 11:1 preferably. The drawing of a lengthwise direction is conveniently carried out using the roll of two which operates at a different rate depending on a desired draw ratio, and the crossing direction drawing is carried out using a suitable tenter frame (stenter frame).

[0043] Since a clip grasps the edge part of a film, Polymer B is extended intrinsically, a thin film is formed, and the edge (12) containing Polymer A is not extended, but it is still thick. A corresponding schematic diagram is shown in drawing 1.

[0044] The temperature which carries out a lengthwise direction drawing and the crossing direction drawing can change to the high range, and it depends for it on each presentation of a layer, and the property of a request of a film. Generally, a lengthwise direction drawing is preferably carried out in 100-160 degrees C in 80-160 degrees C, and the crossing direction drawing is preferably carried out in 130-160 degrees C in 120-170 degrees C.

[0045] After biaxial stretching of a film, the heat setting (heat treatment) of the film is carried out, and about 100-160 degrees C of films are preferably maintained for about 0.1 - 10 seconds in temperature of 110-130 degrees C.

[0046] it mentioned above — as — either of the approaches of common knowledge of one side or both sides of a film after biaxial stretching — corona treatment — or frame processing (flame-treated) was carried out. The reinforcement of processing is 36 - 45 mN/m especially preferably 35 to 50 mN/m usual within the limits.

[0047] two conductors which serve as an electrode in alternative corona treatment — the electrical potential difference (generally AC electrical potential difference) (about 10,000 V or 10,000Hz) which lets a film pass between elements and which is impressed to inter-electrode is the magnitude in which a spray or corona discharge can be performed. Since film surface absentminded mind is ionized and it reacts with a film front face as a result of a spray or corona discharge, a polar intercalation (polar intercalation) is intrinsically formed into a non-polar matrix.

[0048] after surface preparation — or after a heat setting, a film is trimmed with usual cutting equipment and the film itself is rolled round with a well-known rolling-up means in itself. Generally, to 300mm, the edge width of face which should be cut off is 100-200mm preferably, and contains 70 - 90% of the weight of the propylene polymer A 50 to 100% of the weight especially preferably at least 30% of the weight. Generally in the usual manufacture process, a film edge has preferably 20-100 micrometers of thickness of 20-50 micrometers to 200 micrometers. According to a situation, it is considered that small larger or edge thickness than this range is also suitable. Conveniently, beating of all the cut-off (it trimmed) edge parts can be

carried out, it can be granulated, and it can be used for manufacture of a package film as a re-granulation ingredient. By choosing the edge polymer A suitably, it is possible to adjust a re-granulation ingredient to behind, so that a reuse may be carried out to especially this schedule application. By the customary approach, this was impossible.

[0049] This invention is further explained to a detail, referring to an embodiment next.

[0050]

[Example]

(Example 1) The bright film which has the thickness of 6 micrometers was manufactured by the gradual orientation in simultaneous extrusion, and the lengthwise direction and the crossing direction of subsequent. The manufactured film has a monolayer. The adapter approach was used for manufacture of the "cut-off edge-film-cut-off edge" arranged at juxtaposition. 90 degrees of the usual adapter arrangement are rotated.

[0051]

A Original copy polymer: Isotactic polypropylene from Borealis 100 % of the weight Trade name VB2142E Melt flow index = 2.2g / 10 minute B Cut-off edge polymer: Isotactic polypropylene from Hoechst 100 % of the weight Trade name Hostalen PPN 1066 Melt flow index = 3.0g / 10 minutes (manufacture conditions in each process :)

extrusion-molding: — temperature: — an A horizon 280 degrees C A B horizon 280 degrees C rolling-up roll temperature 90-degree-C lengthwise direction drawing: — temperature : 150 degrees C Lengthwise direction draw ratio The 5.5 crossing directions drawing : [Temperature :] 160 degree C The crossing direction draw ratio 9.5 heat settings: Temperature: 140 degrees C Convergence (convergence) 15% [0052] (Example 2) As compared with the example 1, arrangement and molding of melt were carried out using the so-called eyelet die (see drawing 5 and 6).

[0053] : (melt flow index :) which used the following measuring method since a raw material and a film were characterized — a melt flow index — DIN53 In 21.6-N load and 230 degrees C, it measured like 735.

[0054] (Melting point :) A part for maximum [of DSC measurement and a melting point curve], and heating rate/of 20 degrees C [0055] (Degree of crystallinity :) Degree of crystallinity was measured using the X-ray diffraction method. In this case, the amended diffraction X-ray intensity was proportional to the molar fraction of an amorphous phase and a crystal phase.

[0056] (Glass transition temperature :) DSC (differential scan calorimetry) investigated the sample. The heating rate was a part for 20K/. In order to remove the heat history of a sample, the sample was heated and quenched with DSC equipment to the temperature which exceeds a glass transition point (TG) at first, and then was heated again (the 2nd heating phase). Glass transition temperature was measured as 1/2 of phase height (step height) from the thermogram of the 2nd heating phase.

[0057] (Vicat softening temperature :) Vicat softening temperature VST/B/120 are 150. 306 DIN53 It measured according to 460.

[0058] (Residual ash content :) For measurement of a residual ash content, the quantum of the rate of a noncombustible inorganic bulking agent is carried out. A residual ash content (ignition loss) is computed from the weight of the beginning of a sample, and ignition residue. A measurement result is expressed with ppm. About 1kg typical sample is extracted from sample offering matter (granulation, playback matter, etc.). It is not polluted, this matter must be dried thoroughly and predrying in about 80 degrees C in; forced-circulation furnace is required. The porcelain crucible of three empty is ignited in 650 degrees C for at least 1 hour within a crucible furnace, it cools to a room temperature within a desiccator, and then weighing capacity is carried out in the precision of 0.1mg. Ignition is repeated until coincidence of weight is obtained with the weighing capacity of two continuation. Next, the 50g (**0.1g) matter is put into each crucible, and ***** and a crucible are put into a 650-degree C muffle furnace. Next, the temperature in a furnace is raised at 1000 degrees C, and ignition is carried out in this temperature for at least 1 hour. After cooling a crucible within a desiccator, weighing capacity of the crucible is carried out in the precision of 0.1mg. An ash content is expressed per ppm (=mg/m3). (the final mass g) / :ppm= [sample weight (g)] x1,000,000[0059 which evaluates all the 3 crucibles by the

following type, mixes two values which have the minimum difference, and acquires the average --] (Chlorine content :) DIN51 According to 001 and PERT 1, the chlorine content of polyolefine is measured using an X-ray fluorescence analysis (XFA). Granulation/powder is compressed, a pellet is manufactured and it measures by XFA to a measuring curve. This measuring curve was obtained using 10 measuring sample (calibration sample) which measured the chlorine content by the wet chemistry approach of having become independent.

[0060] (Determination of molecular weight :) 3-detector gel permeation chromatography is used for measurement of average molecular weight N_w . The matter is dissolved in a mobile phase (for example, THF), and it adds to a separation column. A separation column is 90cm die length, and fills this up with the porosity carrier whose degree of hole is 5 micrometers. By UV absorption spectroscopy in various wavelength, detection is carried out using a refractive index and the light-scattering force of a fraction. Measuring (calibration) is carried out using the reference compound which has known molecular weight. The comparison with UV absorbance of the standard substance and the absorbance of a sample enables calculation of molecular weight (DIN 55 672, PERT 1).

[Translation done.]

* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view of the film obtained by the flat sheet die using Polymer A and Polymer B according to the approach of this invention.

[Drawing 2] It is the explanatory view of a customary activity of the standard adapter for obtaining the three layer film of simultaneous extrusion.

[Drawing 3] It is the explanatory view of an activity of the simultaneous extrusion adapter in the arrangement in the approach of this invention rotated 90 degrees.

[Drawing 4] It is the explanatory view of an activity of the simultaneous extrusion adapter in the arrangement in the approach of this invention rotated 90 degrees.

[Drawing 5] It is drawing showing the basic structure of the eyelet die suitable for the approach of this invention.

[Drawing 6] It is drawing showing the basic structure of the eyelet die suitable for the approach of this invention.

[Translation done.]

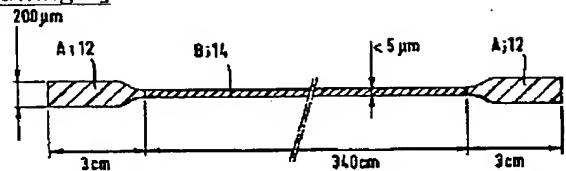
* NOTICES *

JPO and NCIPI are not responsible for any damages caused by the use of this translation.

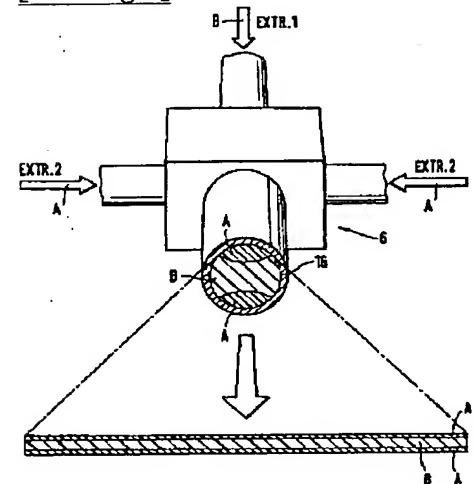
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

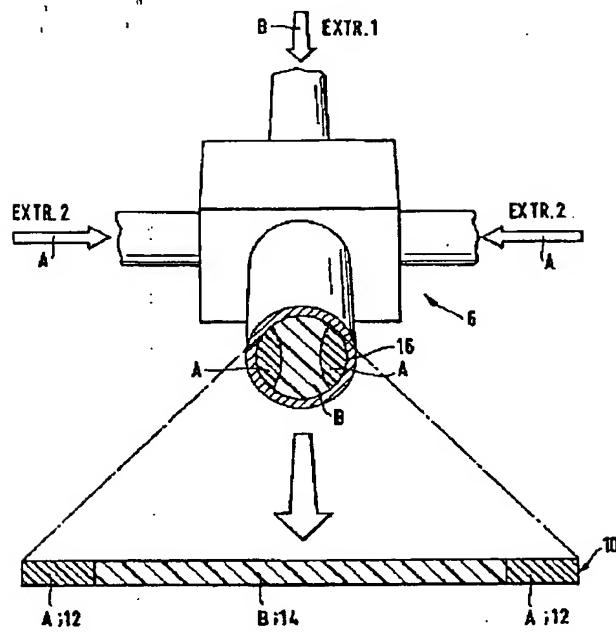
[Drawing 1]



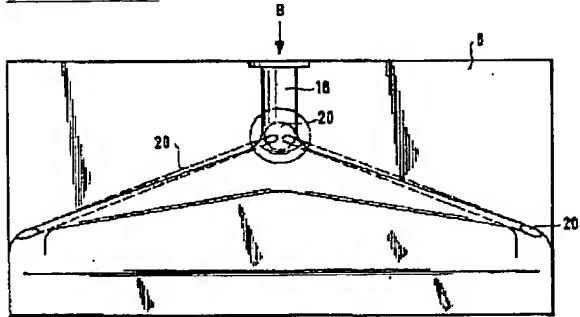
[Drawing 2]



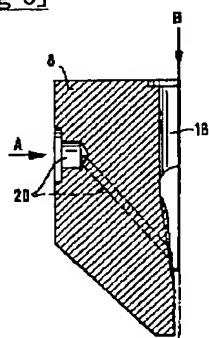
[Drawing 3]



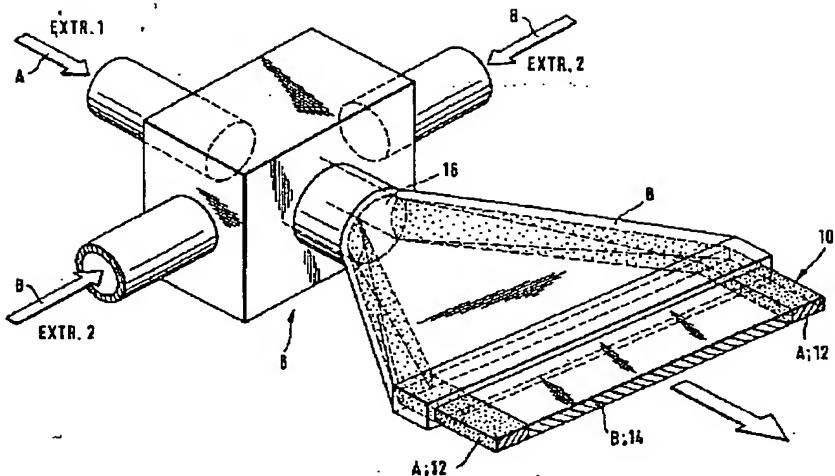
[Drawing 5]



[Drawing 6]



[Drawing 4]



[Translation done.]